Why does my pen Burp and how to solve it

It is an oft heard complaint regarding Indian ED pens and burping.

Burping describes the event when a pen which is being written with, ejects a large droplet of ink to the paper. This can create a mess but can be tackled easily by absorbing the blob of ink with a piece of chalk which was a standard accessory during the school days.
However, a well made pen should never burp.

So then why do some pens burp? There can be a few reasons, let's cover them one by one in the order in which you must determine the root cause.

Leaky section barrel joint:

This joint has to be air tight. Even if this joint is not leaking ink, it is not evidence of it being air tight. If air enters the barrel through this joint, it will displace an equal volume of ink through the path of least resistance which is through the nib and feed onto the paper. In a fountain pen, air must enter the barrel only through the nib and feed, and "not" from any place else. Otherwise, you will have leaks of varying degrees. What are the remedies?

- Check for worn out section-barrel threads; a layer of pure silicone grease NLGI grade 00 (don't worry too much about this) or Rosin Castor Oil paste applied on the section threads with the section screwed into the barrel a couple of times to spread it evenly around and the excess wiped away with a cotton rag can resolve this. Applying this on a new pen is also a good idea.
- Some Indian pen makers employ a Buttress thread profile for their section barrel threads. This profile forms an inherent leak proof seal.

Ill fitting feeders:

The air as you already know, must enter the pen only "through" the nib and feed. When the nibs and feeds are not fitted well to the section, there are annular air gaps that surround the nib and feed even after they have been inserted into the section bore (cylindrical hole) fully. You can check for them by holding the dry section with its nib tip pointing towards a strong source of light and peering from the other end. You should see a single shaft of light through the feed's air channel, and no light from anywhere else. If you do, you have a problem. Many pen makers have forgotten the art of making the correct contours in the section bore. Some pen makers have a loose enough fit that allows you to pull the nibs and feeds out easily by hand. All these have "ill fitting" nibs and feeds. The expert pen makers have a very tight fit of the nib and feed in the section with no annular gaps.

So, what is the solution to this particular problem? There is very little you can do unless you are a pen mechanic already (most "collectors" are also pen mechanics, at least some think they are). From the parts bin, try the next oversized feed. Feeds come in 6.2/6.3/6.4 all the way upto 6.8mm for a nominal 6.35mm feed size. Fit a feed that allows no annular gap or minimizes it. Try to reorient the nib and feed in the section to minimise the annular gaps. The last recourse is to get a new section made from a competent pen maker.

Low ink levels:

When the ink level in an ED filled pen is low, the volume of air in the barrel is more than the volume of ink. In the writing position, the ink is at the section end of the barrel with the air column above it. Hand heat causes the air inside the barrel to expand, this expanding air pushes ink out of the nib-feed, causing either an overflow or a nice blot.

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There are many ways to solve this:

- Look for ED pens with 1.5ml to 2.5ml of ink capacity. Lesser the ink capacity, lesser the volume of air to expand and wreak havoc.
- Or if you already have a large capacity pen, partially block the barrel volume with synthetic cotton wool e.g. recron (easily reversible) or pour molten candle wax in the barrel to reduce its volume.
- The ink being pushed out by expanding air can be "buffered" with a high capacity properly designed finned feeder. A Sheaffer's NN feed works quite well in this role where a 6.35mm diameter feed is specified. Another way is to employ German thread-in nib units which invariably employ a heavily finned feeder.
- Make it difficult for the hand heat to enter the barrel, choose ED pens with a thick barrel wall (Such pens also have less ink capacity to begin with).
- Or if you don't want to do anything from the above, frequently top up the ink, don't allow the ink level to fall much or in other words do not allow the air volume to increase much.
- Or if you don't even want to top up the ink often; before you start writing, hold the uncapped pen nib up, tightly gripped in your fist for a few minutes. This warms the air inside the barrel, allows it to expand and pass out from the feeder without pushing any ink along with it.

Ambient Pressure:

Another factor that acts on the air column inside the barrel is the ambient atmospheric pressure. The pressure inside the barrel will try to become equal to the ambient pressure(which is the pressure outside the barrel). So if your elevation changes suddenly, like while travelling in an aircraft or driving up the high mountains or any other reason, the ambient pressure reduces from what it was at ground level. Thus, the pressure inside the barrel becomes greater[1] than the ambient pressure and it will then tend to equalise by the means of air inside the barrel escaping out the nib-feed path, but only when the pen is carried in the nib up position. If the pen is carried in any other position, the air will push the ink column out through the nib feed path, causing a huge ink leak. This is the situation where pens with ink shut off valves are useful. If the barrel has no air at all i.e. full to the brim, no ink will be ejected[2] despite ambient pressure variations. This explains the advise of keeping your pen full while flying.

I hope these tips and remedies help you in your Indian ED pen journey. The handmade pens themselves are getting scarce with manufacturing moving to CNC, enjoy them while they last.

Cheers!
Hari

[1] Since air is compressible, it also expands when the ambient pressure reduces, thus locally increasing the transient barrel pressure.

[2] Liquids are incompressible (for the purpose of this discussion, at least)